

EXCISE DEPARTMENT.*Notice dated 17th April 1920.*

The auction sales of the Excise privileges of Pavagada Taluk, Tumkur District, will be held on Monday the 10th May 1920, instead of on Saturday the 8th idem, as already notified.

M. A. NARAYANIENGAR,
Offg. Excise Commissioner.

BANGALORE DISTRICT.*Notice dated 29th April 1920.*

It is hereby notified for the information of the Inamdars of the several Inam villages of the Dodballapur Taluk that enquiry into the claim to Toddy Revenue will be held at Dodballapur on 31st May 1920, and the Inamdars concerned are requested to appear before the undersigned on the said date with (1) Original Sannad, (2) copy of the Inam Settlement Register and (3) any other records in their possession proving their enjoyment to the Excise Revenue for a period of fifty years prior to 1892-93, failing which, it will be reported that they are not entitled to the Excise Revenue of the village.

Notice dated 29th April 1920.

It is hereby notified for the information of the Inamdars of the several Inam villages of the Hoskote Taluk, that enquiry into the claim to Toddy Revenue will be held at Hoskote on 15th June 1920. The Inamdars concerned are requested to appear before the undersigned on the said date with (1) Original Sannad, (2) copy of the Inam Settlement Register and (3) any other records in their possession proving their enjoyment to the Excise Revenue for a period of 50 years prior to 1892-93, failing which, it will be reported that they are not entitled to the Excise Revenue of the village.

B. SHAMANNA,
District Excise Officer.

UNIVERSITY OF MYSORE.*Notification No. 10454—dated 22nd April 1920.*

The following are the revised syllabus and scheme of Examinations for the Degree of Bachelor of Engineering in Civil and Mechanical Branches. They will take effect from 1st July next and be made applicable to candidates appearing for examinations in March 1921.

FINAL EXAMINATION IN ENGINEERING**CIVIL ENGINEERING.***A. Lectures.*

- | | |
|--|---|
| 1. Pure Mathematics. | 6. Irrigation and Water-supply, Sanitary and Municipal Engineering. |
| 2. Applied Mathematics | 7. Roads, Bridges and Railways. |
| 3. Applied Mechanics. | 8. Steam and Internal combustion Engines |
| 4. Hydraulics. | 9. Elementary Electrical Engineering. |
| 5. Building and other forms of construction. | 10. Engineering Economics. |

B. Practical Work.

11. Surveying.
12. Drawing and Estimating.
13. Practices in Workshop and Laboratory.

*A. Lectures.***1. PURE MATHEMATICS.**

1. *Differential Calculus.*—Fundamental notions with special applications to geometrical and mechanical problems. Expansions in series. Maxima and minima of functions of one variable and simple examples in two variables. Tracing of well-known curves from their cartesian and polar equations. Curvature, envelope, evolutes, involutes. Change of variable. Partial Differentiation.

Integral calculus.—Integration of standard forms and simple formulae of reduction. Definite Integrals. Lengths and areas of plane curves. Volumes and surfaces of solids of revolution. Integration as the limit of a sum. Double and triple integrals as applied to centres of mass, pressure, and moments of inertia. Planimeters. Elementary standard forms of differential equations.

2. APPLIED MATHEMATICS.

A more detailed study of course 1 (*vide* syllabus Intermediate Examination in Engineering) with special reference to the applications of the calculus including the following:

Kinetics.—Motion of a particle on a curve. D'Alembert's principle. Angular momentum and kinetic energy of a rigid body in motion.

Statics.—Force and funicular polygons. Virtual work. Stable and unstable equilibrium. Equilibrium of forces in three dimensions. Bending moments. The common catenary.

Hydrostatics.—Transmission of fluid pressure. Thrusts due to fluid pressure on a plane area. Centre of pressure. Fluid thrusts on bodies wholly or partially immersed. Equilibrium of floating bodies. Metacentre. Hydrostatic Machines. Principles underlying the action of suction pump, force pump, centrifugal pump, syphon and hydraulic press.

3. APPLIED MECHANICS.

(Treated graphically as well as analytically)

1. *Stress and Strain and Testing of materials.*

(a) Modulus of elasticity and resilience, elastic limit, and fatigue of metals. Factor of safety and working stress. Simple and compound states of stress. Ellipse of stress.

(b) Testing of materials of construction and the Mechanical properties of materials.

2. *Theory and Design of structures in wood, iron and masonry.*

(a) Frames of different kinds for roofs, bridges and other structures under different conditions of loading including wind pressure. Stress diagrams and method of sections.

(b) Beams—Bending moment, and shearing force for fixed and moving loads. Continuous beams. Deflection and stiffness.

(c) Combined bending and thrust. Struts and columns. Gordon's Rankine's and Euler's formulae.

(d) Torsion. Strength of shafting and other practical applications.

(e) Shells and thick cylinders.

(f) Arches of metal and masonry, masonry dams and weirs, retaining walls, chimneys, towers and foundations.

(g) Rivetted joints and bolts and other connections.

4. HYDRAULICS.

Motion of water. Stream line and turbulent motion. Bernoulli's theorem and its simple applications.

Orifices and notches.—Discharge from orifices, notches and mouth pieces. Weirs and anicuts. Bridge openings. Co-efficients and their variations in different cases.

Flow in pipes.—Discharge through pipes. Losses of head in pipe at bends, valves, etc. Syphons and nozzles.

Flow in channels.—Calculation of discharges and design of sections.

Rivers.—Estimation of discharges. Gauging. Current meter, etc.

Meters.—Venturi meter and other meters.

Hydraulic appliances.—General description and methods of working of hydraulic appliances such as turbines, water wheels, and pumps and water lifts.

5. BUILDING AND OTHER FORMS OF CONSTRUCTION.

Foundations. Masonry and brick work. Building construction. Principal orders in Architecture. Reinforced concrete.

6. IRRIGATION AND WATER-SUPPLY, SANITARY AND MUNICIPAL ENGINEERING.

(a) *Irrigation*.—

(1) Rainfall and run off.

(2) Design, construction and maintenance of tank and reservoir works. High masonry Dams.

(3) Design, construction and maintenance of anicuts, canals and channels and subsidiary masonry works such as head sluices, aqueducts, superpassages, weirs, sluices, etc.

- (4) Distribution and regulation of water.
- (b) *Water Supply*.—Design of works by storage and pumping. Filtration and distribution. Jewel Filters.
- (c) *Sanitary and Municipal Engineering*.—General principles of designing works of drainage and sewage of towns. Flushing arrangements including pumping stations, laying of sewers and methods of purification. General principles underlying Town Planning. Town refuse collection and disposal.

7. ROADS, BRIDGES AND RAILWAYS.

- (a) *Roads*.—Earthwork. Location, design, construction and maintenance of roads. Earth, gravel and metalled roads. Retaining walls.
- (b) *Bridges*.—Location, design and construction. Waterway. Foundations.
- (c) *Railways*.—General principles of location, design and construction of Railways. Setting out tunnels and their construction. General description of harbour works and their construction.

8. STEAM AND INTERNAL COMBUSTION ENGINES.

Boilers.—Various types of boilers—Vertical, land and marine, such as, Lancashire, Cornish, water tube, smoke tube, Locomotive and Yarrow boilers. Types of furnaces and methods of firing boilers by hand.

Steam Engines.—Properties of steam. Entropy diagram. Calendar's equation. Carnot's perfect engine; Rankine's cycle Engines. Simple, compound and multiple expansion engines. Pumps and air compressors.

Various types of condensers.—Atmospheric, jet, surface condensers, Internal combustion engines. Gas and oil engines, description of the important types.

9. ELEMENTARY ELECTRICAL ENGINEERING.

(The subject will be dealt with only on general lines).

- (a) *Elementary Magnetism and Electricity* as usually covered by first courses in Physics. Magnets and magnetic materials—magnetic field—The laws of magnetic attraction and repulsion.

Static Electricity—Electrostatic field, Frictional electricity, machines—conductors and non-conductors of electricity.

- (b) *Magnetic and Electrical Units*.—Lines of force, units of Magnetism and Electrical charge, Magnetic and Electric potentials, capacity. Electric current, Resistance and potential.

- (c) *The Magnetic and Electric Circuits*.—Relation between electric current and magnetic flux. Magnetic properties of iron. Saturation curves. Solenoids and lifting magnets.

Laws of Electro-magnetic induction.

Ohms law.

Direct and Alternating current circuits. Resistance, reactance, Impedance, self and mutual induction. Hysteresis and Eddy currents.

- (d) The magnetic and electric circuits of the following electrical machinery, and their characteristics.

Transformers.

Alternators.

Continuous current Generators.

A. C. & D. C. motors and

Rotary converters.

- (e) Generation, transmission and Distribution of electric power, steam, gas and hydro-electric power stations, transmission lines, receiving stations and distribution circuits.

- (f) Industrial applications of Electric power in various forms such as motor drives for mills, tramway, pumping, etc., electric heating in furnaces and the care and maintenance of the various electrical apparatus.

10. ENGINEERING ECONOMICS.

Efficiency management or human engineering (including social welfare work for labour) according to recent theories, Organisation and control of labour. Trades unions, their de-

velopment, utility and drawbacks; workman's insurance and old age pensions, factory legislation. System of accounts. Specification and contract. Capital and Revenue. Productive and protective works and their financing. Maintenance and operation. Losses due to depreciation, interest, etc. Drawing up of departmental reports.

B. Practical Work.

11. SURVEYING.

- (a) *Surveying and mapping*—Theodolite. Different forms of theodolite such as the Everest and the Transit. Uses and adjustments. Triangulation and traversing with the theodolite and finding heights and distances. Setting out curves. Use of the sextant and planimeter.
- (b) Hill and tank contours. Laying out hill roads. Engineering Surveys for tanks, canals and roads and railways and drainage. Enlarging maps.
- (c) General operations of setting out and measuring engineering works.
- (d) *Drawing*.—Drawing from sketches and specifications for Buildings, Bridges and Irrigation works.

12. DRAWING AND ESTIMATING.

- (b) *Estimating and specifications*.—Ordinary cases of Buildings, Bridges and Irrigation Works.

13. WORKSHOP PRACTICE AND LABORATORY.

- (a) Workshop practice in lathe and other simple machines.
- (b) *Testing machine and its construction*.—Testing the strength of materials. Cement and mortar-testing.
- (c) Photography.

Scheme of Examination for the Degree of Bachelor of Engineering.

CIVIL BRANCH.

Serial No.	Subjects	Items of syllabus	Number of papers	Hours for each paper	Marks for written examination	Marks for oral and practical	Marks for records of class work	Minimum for passing	Remarks
*1	Differential and Integral Calculus	1	1	3	70		10		Paper common to Civil & Mech. Branches
2	Statics, Dynamics and Hydrostatics	2	1	3	70		10		Do
3	Applied Mechanics and Graphic Statics	3	1	2½	80		50		Do
4	Hydraulics and hydraulic appliances	4	1	3	60		15		
5	Building and other forms of construction.	5	1	3	80		35		
6	Irrigation, Water-supply, Sanitary and Municipal Engineering.	6	1	3	120		50		
7	Roads, Bridges and Railways	7	1	3	100		35		
8	Steam and Internal combustion Engines	8	1	2	60		15		
9	Elementary Electrical Engineering	9	1	2	60		15		Common paper to Civil & Mech. Branches
10	Economics (Engineering)	10	1	2	40		10		Do
11	Surveying	11	1	3	100	75	80		
12	Drawing	12a	1	4	75		100		
13	Estimating and Specifications	12b	1	3	60		15		
14	Workshop and Laboratory	13					60		
	Total		14		1,025	75	500	66 per cent. for 1st class 50 Do for a pass	

*N. B.—Questions should be set mainly in Integral Calculus for the students who may appear in 1921 as they have already been examined in Differential Calculus.

FINAL EXAMINATION IN ENGINEERING.

II. MECHANICAL ENGINEERING.

A. Lectures.

- | | |
|--|--------------------------------------|
| 1. Integral and Differential Calculus. | 7. Heat Engines. |
| 2. Statics and Dynamics, and Hydrostatics. | 8. Power Plant Engineering |
| 3. Applied Mechanics | 9. Elementary Electrical Engineering |
| 4. Hydraulics and Hydraulic Machinery. | 10. Machine Drawing |
| 5. Theory of Machines | 11. Estimating and Specifications |
| 6. Machine Design and Construction | 12. Engineering Economics. |

B. Practical Work.

- | | |
|-------------------|-----------------|
| 13. Machine Shop. | 14. Laboratory. |
|-------------------|-----------------|

A. Lectures.

1. INTEGRAL AND DIFFERENTIAL CALCULUS.—As for Civil Engineering.
2. STATICS AND DYNAMICS. Do
3. APPLIED MECHANICS. Do
- and GRAPHIC STATICS. Do

4. HYDRAULICS AND HYDRAULIC MACHINERY.

(a) *Hydraulics*.—Motion of water—stream line and turbulent motion. Bernoulli's theorem and its simple applications.

Orifices and notches.—Discharge from orifices, notches and mouth pieces. Weirs and anicuts. Bridge openings. Co-efficients and their variations in different cases.

Flow in pipes.—Discharge through pipes. Losses of head in pipes at bends, valves, etc., Syphons and nozzles.

Flow in channels.—Calculation of discharges and design of sections.

Rivers.—Estimation of discharges. Gauging. Current Meter.

Meters.—Venturi meter and other meters.

(b) *Hydraulic Machinery*.—Theory, design and efficiency of pumps. Lift pump and force pumps. Worthington pumps. Centrifugal and air lift pumps. Pulsometer. Hydraulic Press. Hydraulic rams. Turbine and water wheels. Hydraulic cranes. Hydraulic lifts and hydraulic rivetter. Hydraulic transmission of power, accumulators, etc.

5. THEORY OF MACHINES.

Kinematics.—Definition of a Machine. Machine elements and pairs. Laws of Motion. Constrained Motion. Combinations of pure mechanism.

Links and chains.—Conic crank chain. Virtual centres—centrodes. Relative linear and angular velocity. Displacement, velocity and acceleration diagrams.

Wheel trains and teeth, cams.—Epicyclic gearing.

2. *Effort and Resistance*.—Crank effort and crank effort diagrams. Governors and fly wheels. Balancing of machines. Simple cases of gyrostatic action.

3. *Friction in Mechanisms and Machines*.—Friction in sliding and turning pairs. Friction in pivots and toothed gearing. Brakes and dynamometers.

4. *Miscellaneous Mechanism*.—Parallel motion.

5. *Typical Machine tools*.

6. MACHINE DESIGN AND CONSTRUCTION.

1. *General*.—Strength and properties of materials, used in machines. cast iron, wrought iron, mild steel, alloy steels and antifriction metals.

2. *The Design of simple machine parts*.—Fastenings, bolts, nuts, keys, cotters, rivet and rivetted joints. Jointing materials and joints for prevention of leakage. Pipes and pipe joints. Bearings (forms and proportions of), (1) swivel, (2) thrust, (3) footstep, (4) crank-shaft, (5) connecting rod, (6) ball and roller. Locomotive axle box. Pedestals, hangers, brackets and wall boxes. Types of lubricators.

3. *The transmission of power*.—Shafts, journals, couplings, pulleys, belts and ropes, toothed gearing.

4. *Design of Engine and boiler details*.—Engine details including connecting rod, crank shaft bearings, fly-wheels, pistons, slide-valves. Area of steam ports, Zeuner and other valve diagrams. Different types of boilers and accessories including feed pumps, feed-water heaters and condensers.

HEAT ENGINES.

1. *Thermodynamics*.—Mechanical Theory of Heat. Work done and heat expended in expansion. Cycles of perfect gases and vapours. Expansion of steam, ammonia and carbonic-acid, work done and heat required.

2. *Steam and the steam engine*.—Brief history, of the steam engine. Properties of saturated and superheated steam. Expansive working. Cylinder, condensation. Effect of expansion on dryness. Methods of calculating dryness fraction. Entropy. Entropy-Temperature diagrams.

Simple, compound, triple and multiple expansion engines. Indicating and Indicator diagrams. Cylinder losses. Jackets, superheaters, economisers, condensers.

Steam turbines.—Flow of steam through orifices, design of blades and other details for impulse and reaction turbines.

3. *Internal combustion engines*.—Theory and principles of operation. Construction features of various types, fuel mixtures, carburetion, systems of speed control, ignition, lubrication and cooling.

Suction gas producers and gas engines.

4. *Air and air engines*.—Sterling and other form of air engines. Air compressors and Refrigerators.

5. *Boilers*.—Cornish, Lancashire, vertical. Setting of Cornish and Lancashire Boilers. Multitubular Locomotive. Portable. Water tube-Stirling, Babcock and Wilcox Fittings. Safety valves, steam and water gauges, fusible plugs, stop valves. Economisers and superheaters. Mechanical Stokers, forced draught and smoke prevention. Injectors and Ejectors. Pulsometers.

8. POWER PLANT ENGINEERING.

1. *Power Plants*.—This course embraces a study of the methods employed for the transmission and measurement of power in machine shops and factories. Prominence is given to matters of efficiency, advantages and disadvantages and conditions of use of the various forms of transmission. Attention is also given to the design of transmission machinery, and the design, arrangement and operation of the equipment in power plants.

2. *Shop and shop Management*.—Lectures on the arrangement and construction of buildings for manufacturing plants; types of buildings, methods of roof construction and of lighting and heating plants; arrangement of machinery and installation of cranes and hoists; the organisation and management of shops; methods of paying wages; systems of cost accounting and shop book-keeping; specifications and contracts; economics of power generation and transmission; costs of maintenance and operation; losses due to depreciation, interest, etc.; and total cost of power per horse power per hour, per year, including interest, rent, depreciation, labour, fuel.

3. *Fuels*.—Calculations on combustion of fuel—such as calorific value of fuel. Given its composition, to find the theoretical quantity of air required and the composition of flue gases. Given the composition of flue gases, to find the excess of air.

Types of fuel—Solid, liquid and gaseous—and their advantages and disadvantages.

Solid fuel—Wood, charcoal and coal.

Manufacture of charcoal.

Formation, nature and source of coal. Classification of coal. Carbonization of coal and manufacture of coke.

Liquid fuel. Formation, nature and source and petroleum. Distillation of petroleum and manufacture of petrol, kerosine oil, etc. Manufacture of Alcohol and shale oil, benzene, Tar oils.

Atomisers suitable for burning oils under boilers.

Gaseous fuel. Natural and blast furnace gases. Manufacture and nature of coal gas, producer gas, water gas, semi-water gas, suction gas, etc. Bye-product recovery plants.

Surface combustion and combustion of gas under boilers. Testing of various types of fuel for their calorific value.

4. *Lubricants and Packing Materials*.—Lubricants.—Classes of lubricants; mineral, vegetable and animal sources. Qualities and properties of lubricants; viscosity and "oiliness." Testing of lubricating oils. Lubricants for different classes of machinery.

Packing Materials.—Carbon packing. Packing for Hydraulic cylinders. Alloys for metallic packing.

9. ELEMENTARY ELECTRICAL ENGINEERING. As for Civil Engineering.

10. MACHINE DRAWING.

Drawings of machines from sketches. Preparation of working drawings from actual measurements of details and complete machines.

11. ESTIMATING AND SPECIFICATIONS.

Estimating of the cost of simple machines and structures, e.g., cast iron columns, water tanks, roof trusses, etc. Specifications for materials of construction used in the simpler machine parts.

12. ENGINEERING ECONOMICS. As for Civil Engineering.

B. Practical Work.

13. MACHINE SHOP PRACTICE.

Turning with hand and slide lathes. Screw cutting. Exercises in drilling and boring. Planing. Slotting. Milling and machining.

14. LABORATORY.

This course is designed to familiarise the student with the use of instruments used in engineering work and with processes of investigation; also, to give training in accuracy and reliability in securing data and analysing results, and in the conducting and reporting of experimental steam and gas engineering work. The experiments involved include a study of the various auxiliary apparatus used in connection with steam and gas machinery, calibration of instruments, such as thermometers, pressure gauges, steam and gas engine indicators, etc., test of elementary power transmission machinery and friction tests of different types of steam and gas engines.

Steam boiler tests for determining the evaporative efficiency of boilers of different types under conditions of ordinary use; the determination of efficiency of steam and power pumps and steam injectors when operated under various conditions.

Tests of simple, compound and triple expansion engines for the determination of the power developed, the weight of steam used, the interchange of heat between the walls of the cylinder and the contained steam, and the general efficiency of the engine.

Thermal efficiency tests of gas, gasoline and oil engines and automobile motors, tests of gas producers, air compressors and air machinery.

Photography.

Scheme of Examination for the Degree of Bachelor of Engineering.

MECHANICAL BRANCH.

Serial No.	Subjects	Item of syllabus	No. of papers	Hours for each paper	Marks for written examination	Marks for oral and practical	Marks for records of class work	Minimum for passing	Remarks
Theoretical.									
1	Integral and Differential Calculus ...	1	1	3	70	...	20	66 per cent for 1st class 50 do for a pass.	
2	Statics and Dynamics and Hydrostatics ...	2	1	3	70	...			
3	Applied Mechanics ...	3	1	2½	80	...	50		
4	Graphic Statics ...		2	4	50	...			
5	Hydraulics and Hydraulic Machinery ...	4	1	3	60	...	20		
6	Theory of Machines ...	5	1	3	100	...	30		
7	Machine Design and Construction ...	6	1	2	100	...	60		
8	Heat Engines ...	7	1	3	100	...	20		
9	Power Plant Engineering ...	8	1	3	80	...	40		
10	Elementary Electrical Engineering ...	9	1	2	60	...	15		
11	Machine Drawing ...	10	1	4	100	...	100		
12	Estimating and Specification ...	11	1	3	40	...	15		
13	Engineering Economics ...	12	1	2	40	...	10		
Practical.									
14	Machinshop ...	13	...	...	...	75	60		
15	Laboratory ...	14	...	...	...	75	60		
Total		...	13	...	950	150	500		

N.B.—Questions should be set mainly in Integral Calculus for the students who may appear in 1921 as they have already been examined in Differential Calculus.

There will be common papers in subjects 1, 1, 3, 4, 10 and 13 for both the Civil and Mechanical Branches.

V. SUBRAHMANYA IYER,

Offg. Registrar.